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EXAMINER	
TRAN, NHAN T	

ART UNIT	PAPER NUMBER
2615	6

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/945,094	Applicant(s) ZHANG, XUEMEI	
	Examiner Nhan T. Tran	Art Unit 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,13-15 and 17-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,13-15 and 17-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 1/12/2004 with respect to claims 4, 11 & 15 have been fully considered but they are not persuasive.

On page 8, second paragraph, the Applicant asserts that Wagensonner et al do not teach or suggest tone correction and color adjustment on values in a positive linear color space and they only teach and suggest saturation adjustment on YUV color space. In response, the Examiner respectfully disagrees with the Applicant. Although Wagensonner teaches color saturation adjustment on a color image data, it is inherent that the color saturation also represents color tone of the image. To support the Examiner's position for the inherency of color tone represented by color saturation, a reference to Taniguchi et al (US 4,021,843), col. 1, line 27-29 is cited, wherein Taniguchi clearly describes that the color tone of an image is adjusted by the color saturation control device. With respect to the limitation "a positive linear color space," the Examiner respectfully submits that the YUV is also a positive linear color space as demonstrated by Wagensonner in Fig. 4, wherein all values of Y, U and V are positive values in a linear space. To further support this clarification, the Examiner would like to cite a reference to Ulichney (US 5,233,684), col. 2, lines 49-51. Ulichney discloses that the YUV color space is a standard linear color space. Therefore, the limitations of claims 4 & 11 are met by Wagensonner et al and the limitations of claim 15 are met by Wagensonner et al in view of Gindele et al as submitted in the previous Office Action.

2. Applicant's arguments filed 1/12/2004 with respect to the rejection of claim 1 (now amended), under 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wagensonner et al (US 4,812,903) and Hirose (US 5,557,429).

Claim Objections

3. Claim 11 is objected to because of the following reason set forth below:

On line 5 of claim 11, the term "the first color channels" is suggested to change to "the first color channel" to be consistent with the defined "a first color channel." Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 4, 6, 11, 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Wagensonner et al (US 4,812,903).

Regarding claim 4, Wagensonner discloses a method of applying a tone-mapping function (adjustment of color saturation by mapping/applying a factor to color channels) to a digital image (output at A/D converter 4 in Fig. 1) represented in positive linear color space (Fig. 4 shows a positive linear YUV color space), the positive linear color space including an AL channel (Y1) and at least one Ak channel (U1 or V1), the AL channel (Y1) most closely matching the relative luminance response of the human visual system, for each pixel (Figs. 1 & 5 and col. 6, lines 5-8) the method comprising:

applying a tone mapping function to the AL channel of each pixel to generate a tone-corrected relative luminance value A'L (Y2) for each pixel; and transforming Ak channel values of each pixel according to A'k = (Ak/AL) x A'L , **which can be expressed as A'k = Ak x (A'L/AL)** which is equivalent to equation (7) shown in col. 12, lines 15 – 29 and Fig. 5, wherein:

A'k is represented by U2 or V2,

Ak is represented by U1 or V1, and

A'L/AL is represented by Y2/Y1.

Regarding claim 6, Wagensonner inherently teaches that the pixels are processed independently, whereby a scale factor is specific to each pixel (see Fig. 5; col. 5, lines 28-32 & lines 57-63 & col. 6, lines 5-8).

Regarding claim 11, see the analysis in claim 4, wherein the values of the first color channel (Y1) are changed by a scale factor (Y2/Y1).

Regarding claim 14, see the analysis in claim 6.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 5, 7-10, 13, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagensonner et al (US 4,812,903) in view of Hirose (US 5,557,429).

Regarding claim 1, Wagensonner discloses all the limitations of claim 1 as analyzed in claim 4, wherein a change in value of the first color channel is the ratio of Y2/Y1 (Fig. 5), except for disclosing the scale factors are computed according to noise balancing terms of the first color channel.

However, as taught by Hirose, a noise quantity of a small positive number which is not perceived visually is accordingly added to each color channel during color correction and transformation processes to cancel the visual adverse effects by image noise, tone steps, and the like, which are inherently contained in the input image data signal so that a clear, good quality image is reproduced (see Figs. 2 & 12; col. 8, lines 23-40 & col. 9, lines 29-37). It is noted that there are missing equal signs (=) in formula 3 for color channel L'(x,y) and a'(x,y) due to typo errors.

Therefore, it would have been obvious to one of ordinary skill in the art to add a noise balancing term having a small positive number to each color channel by way of scale factors (Y2/Y1) during the color correction and transformation of colors in Wagensonner so that image noise, tone steps and the like contained in the original image would be reduced without deteriorating the color tone and sharpness of the image.

Regarding claim 2, see the analysis in claim 4.

Regarding claim 3, it is inherent that the noise balancing terms are a triplet numbers proportional to a white point of a color space of the channels since the white point is a reference point of a color space in that any added noise value to the three color channels of the color space must be proportional to that reference point.

Regarding claim 5, see the analysis in claims 1 & 4, wherein a noise balancing term is added to each color channel, wherein the combination of Wagensonner and Hirose would produce the formula as shown in claim 4 with addition of small positive numbers to Ak and AL values.

Regarding claim 7, the claim limitations of claim 7 are encompassed by claims 4 & 5, wherein XYZ color space is represented by YUV color space (Wagensonner, Figs 4 & 5) or La*b* color space (Hirose, Fig. 12 in col. 6, lines 30-39), and noise balancing terms are added to the color space of XYZ.

Regarding claim 8, see the analysis in claim 3 and Hirose in col. 6, lines 36-39 for CIE tristimulus channel system.

Regarding claims 9 & 10, the combination of Wagensonner and Hirose as analyzed in claims 4 – 8 teaches the implemented color space is either YUV or La*b* color space. Although Wagensonner and Hirose do not directly disclose the implemented color space is RGB, an Official Notice is taken that the color spaces can be implemented interchangeably depending on certain applications.

Therefore, it would have been obvious to one of ordinary skill in the art to recognize that the teachings of Wagensonner and Hirose would also be applied to any color space including RGB color space.

Regarding claim 13, the combination of Wagensonner and Hirose as analyzed in claim 5 has met the limitation of the processor adds noise balancing terms when computing scale factors for the other color channels.

Regarding claim 18, see the analysis in claim 1.

Regarding claim 19, see the analysis in claim 5.

Regarding claim 20, see the analysis in claim 3.

6. Claims 15 & 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagensonner et al (US 4,812,903) in view of Gindele et al (US 6,594,388).

Regarding claim 15, Wagensonner discloses all the limitations of claim 15 as analyzed in claim 4 except for expressly disclosing using software instead of hardware to implement the processes as analyzed in claim 4. However, the implementation of image signal processing utilizing hardware circuitry can be realized by software, or vice versa as taught by Gindele in col. 6, lines 5-42.

Therefore, it would have been obvious to one of ordinary skill in the art to implement the image processing apparatus in Wagensonner in software configuration instead of hardware circuitry since both implementations would provide the same result; moreover, circuitry of the apparatus would be reduced by implementing with software configuration.

Regarding claim 21, Wagensonner discloses all the limitations of claim 21 as analyzed in claim 1 except for expressly disclosing using software instead of hardware to implement the processes as analyzed in claim 4. However, the implementation of image signal processing utilizing hardware circuitry can be realized by software, or vice versa as taught by Gindele in col. 6, lines 5-42.

Therefore, it would have been obvious to one of ordinary skill in the art to implement the image processing apparatus in Wagensonner in software configuration instead of hardware

circuitry since both implementations would provide the same result; moreover, circuitry of the apparatus would be reduced by implementing with software configuration.

7. Claims 17, 22 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagensonner et al and Gindele et al as applied to claims 15 and 21 and in further view of Hirose (US 5,557,429).

Regarding claim 17, the Examiner would like to refer the same rejections as applied to claims 15, 13 and 1.

Regarding claim 22, see the analysis in claim 5.

Regarding claim 23, see the analysis in claim 3.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (703) 605-4246. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew B Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.

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